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| Notice of Allowability | Application No. | Applicant(s) | |
| | 10/624,351 | GANFIELD ET AL. | |
| | Examiner | Art Unit | |
| | Albert T. Chou | 2616 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the application filed on 22 July 2003.
2. ☒ The allowed claim(s) is/are 1-12.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|--|--|
| <ol style="list-style-type: none"> 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) 3. <input type="checkbox"/> Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____ 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit of Biological Material | <ol style="list-style-type: none"> 5. <input type="checkbox"/> Notice of Informal Patent Application 6. <input type="checkbox"/> Interview Summary (PTO-413), Paper No./Mail Date _____. 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance 9. <input checked="" type="checkbox"/> Other _____. |
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DETAILED ACTION

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mr. William J. McGinnis on March 12, 2007.

Claims 1, 2, 5, 6, and 9-12 of the application have been amended as shown in attached sheets.

Allowable Subject Matter

2. Claims 1-12 are allowed.

Reasons for Allowance

3. The following is an examiner's statement of reasons for allowance.

The prior art does not teach or fairly suggest the following:

A method, an apparatus and a computer-readable storage medium storing a plurality of computer executable instructions for implementing packet ordering in a network processor, comprising the steps, or functions of:

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providing a queue entry, for each received autoroute packet, including an autoroute indication and a selected transmit queue;

providing an associated ordering queue with each receive queue; and
automatically moving each autoroute packet reaching a head of the receive queue to the selected ordering queue as specified in claims 1, 5 and 9.

The closest prior art, either singularly or in combination, fails to anticipate or render the above limitations obvious.

Conclusion

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- US Patent No. 6,952,402 to Crocker et al. disclose "Apparatus And Method For Manipulating Packet Ordering Over Parallel Links Of A Crossbar Base Switch Fabric"
- US Patent No. 6,064,674 to Doidge et al. disclose "Method And Apparatus For Hardware Forwarding Of LAN Frames Over ATM Networks"
- US Patent No. 5,939,915 to Klausmeier et al. disclose "System For Buffering Data In The Network Having A Linked List For Each Of Said Plurality Of Queues"

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- US Patent Application Pub. No. 2003/0108066 A1 by Trippe discloses "Packet Ordering".
- US Patent No. 6,934,294 to Bertagna discloses "Qualified Priority Queue Scheduler"
- US Patent No. 5,648,970 to Kapoor discloses "Method And System For Ordering Out-Of-Sequence Packets"
- US Patent No. 5,260,933 to Rouse discloses "Acknowledgement Protocol For Serial Data Network With Out-Of-Order Delivery"

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Albert T. Chou whose telephone number is 571-272-6045. The examiner can normally be reached on 8:30 - 17:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chi H. Pham, can be reached on 571-272-3179. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Albert T. Chou
March 12, 2007 AC


CHI PHAM
SUPERVISORY PATENT EXAMINER

3/13/07

Attachment

1. (currently amended) A method for implementing packet ordering in a network processor comprising the steps of:

receiving packets and placing said received packets on a receive queue and providing a queue entry for each said received packet; said queue entry including for each autoroute packet, an autoroute indication and a selected transmit queue;

providing an associated ordering queue with said receive queue;

dequeuing a software-handled packet from said receive queue and placing said dequeued software-handled packet on said ordering queue; and

automatically moving each said autoroute packet reaching a head of said receive queue to said selected ordering queue; and

moving a next packet from said ordering queue to a selected transmit queue for network transmission.

2. (currently amended) A method for implementing packet ordering as recited in claim 1 wherein moving a next packet from said ordering queue to a selected transmit queue further includes the steps of:

enqueueing a software-handled packet from said ordering queue to a said selected transmit queue; and

automatically moving each said autoroute packet reaching a head of said ordering queue to said selected transmit queue.

3. (original) A method for implementing packet ordering as recited in claim 1 wherein the step of providing a queue entry for said received packets; said queue entry including for each autoroute packet, said autoroute indication and said selected

transmit queue includes the step of identifying said selected transmit queue by dataflow assist hardware without software intervention.

4. (original) A method for implementing packet ordering as recited in claim 1 wherein the step of dequeuing a software-handled packet includes the step of identifying a pointer to said software-handled packet in a packet segment register.

5. (currently amended) Apparatus for implementing packet ordering in a network processor comprising:

a receive queue for receiving packets; said receive queue including a queue entry for each said received packet; said queue entry including for each autoroute packet, an autoroute indication and a selected transmit queue;

an associated ordering queue with said receive queue;

software for dequeuing a software-handled packet from said receive queue and placing said dequeued software-handled packet on said ordering queue; and

dataflow assist hardware for automatically moving each said autoroute packet reaching a head of said receive queue to said ~~selected~~ ordering queue; and for moving a next packet from said ordering queue to a selected transmit queue for network transmission.

6. (currently amended) Apparatus for implementing packet ordering as recited in claim 5 ~~further includes a transmit queue; and said~~ includes software for enqueueing a software-handled packet from said ordering queue to said selected transmit queue; and wherein said dataflow assist hardware ~~for~~ automatically moves

~~moving~~ each said autoroute packet reaching a head of said ordering queue to said selected transmit queue.

7. (original) Apparatus for implementing packet ordering as recited in claim 5 wherein said dataflow assist hardware identifies said selected transmit queue for each said autoroute packet without software intervention.

8. (original) Apparatus for implementing packet ordering as recited in claim 5 wherein said software for dequeuing said software-handled packet includes a pointer to said software-handled packet in a packet segment register.

9. (currently amended) A computer readable storage media ~~program-product~~ for implementing packet ordering in a network processor system, said computer readable storage media ~~program-product~~ including a plurality of computer executable instructions and ~~stored on a computer-readable medium~~, wherein said instructions, when executed by the network processor system, cause the network processor system to perform the steps of:

providing a receive queue for receiving packets; said receive queue including a queue entry for each said received packet; said queue entry including for each autoroute packet, an autoroute indication and a selected transmit queue;

providing an associated ordering queue with said receive queue;

dequeuing a software-handled packet from said receive queue and placing said dequeued software-handled packet on said ordering queue; ~~and~~

automatically moving each said autoroute packet reaching a head of said receive queue to said ~~selected~~ ordering queue; and

moving a next packet from said ordering queue to a selected transmit queue for network transmission.

10. (currently amended) A computer readable storage media ~~program-product~~ for implementing packet ordering as recited in claim 9 wherein moving a next packet from said ordering queue to a selected transmit queue includes the steps of: enqueueing a software-handled packet from said ordering queue to a said selected transmit queue; and automatically moving each said autoroute packet reaching a head of said ordering queue to said selected transmit queue.

11. (currently amended) A computer readable storage media ~~program-product~~ for implementing packet ordering as recited in claim 9 wherein the step of dequeuing a software-handled packet includes the step of identifying a pointer to said software-handled packet in a packet segment register.

12. (currently amended) A computer readable storage media ~~program-product~~ for implementing packet ordering as recited in claim 9 includes the step of identifying said selected transmit queue by dataflow assist hardware without software intervention.